CONSERVATIVE MANAGEMENT OF A LARGE RADICULAR CYST: A CASE REPORT

Abstract
A radicular cyst arises from epithelial remnants stimulated to proliferate by an inflammatory process originating from pulpal necrosis of a non-vital tooth. Radiographically, the classical description of the lesion is a round or oval, well-circumscribed radiolucent image involving the apex of the tooth. A radicular cyst is usually sterile unless it is secondarily infected. This paper presents a case report of conservative non-surgical management of a radicular cyst associated with permanent maxillary left central incisor, lateral incisor and canine in a 15 year old male patient.

Key words: radicular cyst, conservative management

Introduction:
A cyst is a pathologic cavity filled with fluid, lined by epithelium and surrounded by a definite connective tissue wall. The cyst fluid is either secreted by the cells lining cavity or derived from the surrounding tissue fluid.

Radicular cysts are the most common jaw cyst comprising more than 60% of all odontogenic cysts. They most commonly present in the fourth and fifth decades but affect a wide age range with little gender difference. Most radicular cysts are found in the maxilla, especially around incisors and canines. The majority of radicular cysts go unnoticed and are asymptomatic, with pain usually only a feature if secondarily infected and inflamed. In some instances these cysts can grow large in size and cause expansion of the cortical plate. It is difficult to differentiate a radicular cyst from a periapical granuloma based on radiological analysis as both present as a well-defined round or oval radiolucency associated with the root apex of a non-vital tooth and continuous with the lamina dura. Over the years cyst may regress, remain static or grow in size.

The treatment of the cysts can be either nonsurgical management or surgical management being either marsupialization or enucleation. Nevertheless, no matter what choice it might be, the treatment option should be
kept as conservative as possible. This case report evaluates the successful conservative non-surgical management of a large radicular cyst.

Case report

A 15 year old male patient reported to the department of pediatric and preventive dentistry along with his parents. His chief complaint was continuous severe pain in the left upper front region of the jaw since 5-6 months. He gave a prior history of incomplete root canal treatment w.r.t 21, 22, 23. On intra oral examination left maxillary central incisor, lateral incisor and canine had open root canal orifices and were tender on percussion. Periapical radiograph revealed round radiolucent area around the root apices of 21, 22, and 23. The cystic lesion measured around 2.5 cm in diameter and had well defined corticated borders (fig. 1).

Based on the history, clinical examination and radiographic examination, a clinical diagnosis of infected radicular cyst in relation to 21, 22, and 23 was made and a treatment plan was formulated to manage the case through conservative non-surgical approach.

On the 1st dental visit itself, biomechanical preparation (BMP) of root canals of all the three involved teeth was carried out using K-files (Sybronendo) according to the step back technique. Normal saline (0.9%), sodium hypochlorite (2.5%), hydrogen peroxide (3%) were used as root canal irrigants to augment the effectiveness of BMP. Additionally metronidazole (5%) was used as the final irrigant because of its bactericidal action. The canal orifices were then closed with temporary filling material (cavit) and patient was prescribed antibiotics and analgesics and recalled after 3 days. All procedures were carried out under absolute isolation.

On 2nd visit, provisional restoration was removed and intracanal medicament (Metapex, Meta biomed) was placed w.r.t 21, 22, 23 (fig. 2). After one month (on 3rd visit), calcium hydroxide dressing was changed w.r.t. 21, 22, 23 (fig. 3). Obturation was done with gutta percha using zinc oxide eugenol as sealer after 2 months on 4th dental visit as patient was completely asymptomatic (fig. 4).

One month later the teeth were restored with composite restoration and intra oral periapical radiograph showed healing of the cystic lesion (fig. 5). 5 months and 1yr recall visit IOPA showed further increase in the bony trabaculation around the apex of 21, 22, and 23. (Fig. 6 and 7)

Discussion

Radicular cysts are the most common type of cyst in the jaws. Epithelium at the apex of a nonvital tooth can be presumably stimulated by inflammation to form a true epithelium lined cyst or periapical cyst. The inflammatory response appears to increase the production of keratinocyte growth factor by periodontal stroma cells leading to increased proliferation of normally quiescent epithelium in the area. The source of the epithelium is usually a rest of Malassez but also may be traced to crevicular epithelium, sinus lining, or epithelial lining of fistulous tracts. Cyst development is common; the reported frequency varies from 7% to 54% of periapical radiolucencies. Occasionally, the lining epithelium may demonstrate linear or arch-shaped calcifications known as Rushton bodies. Dystrophic calcification, cholesterol clefts with multinucleated giant cells, may also be present in the lumen wall. The wall of the cyst consists of dense fibrous connective tissue often with an inflammatory infiltrate.

The uninfected cystic fluid is straw coloured or brownish and has cholesterol clefts; a small quantity of keratin flakes may also be identified. In case of a long-standing infection, a dirty-white caseous material or frank pus may be present.

Differential diagnosis

If an untreated asymptomatic tooth with non-vital or diseased pulp has a well-defined radiolucency at its apex, it is dental granuloma or radicular cyst in 90% of the cases. Although these entities cannot be distinguished by radiographic features alone, but if the radiolucency is 1.6 cm or more in diameter or 200 mm, it is more likely to be a cyst. Other diseases to be included in differential diagnosis are:

- Periapical scars
- Early lytic and fibroblastic stage of periapical cement osseous dysplasia (PCOD) Traumatic bone cyst
- Malignancies
- Nasopalatine cyst
- Globulomaxillary cyst
- Dentigerous cyst
- Odontogenic keratocyst

The treatment of these cysts are still under discussion and many professionals opt for a conservative treatment by means of endodontic technique. Periodontic surgeries may have direct procedural consequences that make nonsurgical endodontic treatment preferable over them in cases of periapical cyst. Periapical surgical interventions might be associated with loss of bone support, there is a possibility of damaging blood vessels and nerves present adjacent to the lesion, possibility of damaging nearby anatomic structures like mental foramen, inferior alveolar...
nerve and the maxillary sinus, production of anatomic scars and refusal to undergo surgical procedures, especially in pediatric patients.

During conservative management of radicular cyst, endodontic infection control is a crucial point to be addressed while planning the intervention. For elimination or maximum reduction of microorganisms in the root canal system, the dentist should associate with debridement methods using endodontic files with efficient irrigating solution and intracanal medication. Patency and enlargement of the canals in case of necrotic teeth with periapical lesions helps in eliminating microorganisms from the apical foramen, thus preventing the inflammatory process to perpetuate. Calcium hydroxide dressing was selected because it is reported to provide excellent clinical and laboratorial results. Calcium hydroxide allows rapid release of Ca++ and OH. The benefits of this procedure include anti-inflammatory action through hygroscopic properties forming calcium proteinate bridges and inhibiting phospholipase, neutralization of acidic products such as hidrolases, which can affect the clastic activity, activation of the alkaline phosphatase, antibacterial effect and the destruction of the cystic epithelium, allowing conjunctive tissue invagination to the lesion.

There are few studies which have reported that periapical cysts are refractory to non-surgical endodontic therapy but the fact that these findings are associated to other etiological factors, such as extraradicular infection, presence of foreign bodies and cholesterol crystals, has also been discussed in the literature. DeepakrajDandotikar et al 2013, non-surgically managed a large radicular cyst associated with upper incisors with palatal swelling extending upto 1st premolars. Penumatsa NV et al 2013, presented a case report of a patient with radicular cyst associated with a primary molar. Conservative treatment of the cyst that is marsupialization rather than enucleation was considered to save the premolar tooth bud.

Correct planning of the intervention in cases of periapical cyst is of paramount importance for a successful therapy.

**Conclusion**

Non-surgical management of radicular cyst should be
considered as seen in this clinical case report with emphasis being laid on thorough debridement, disinfection and obturation of the root canal system. However, in specific situations where the size and extent of the lesion is of critical importance, surgical management is a viable option.

References

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